

U.S. Department of Agriculture Report to the Invasive Species Advisory Council for the spring 2013 meeting on March 6-8, 2013

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A. USDA Progress on ISAC recommendations from the October 2003 meeting

- 1. ISAC recommendation: Increase efforts in economic analysis to make the case for investments in invasive species efforts.**

The Economic Research Service (ERS) is continuing the “Program of Research on the Economics of Invasive Species Management” (PREISM) initiated in FY03. PREISM supports economic research and the development of decision support tools that have direct implications for USDA policies and programs for protection from, control/management of, regulation concerning, or trade policy relating to invasive species. Program priorities are selected through extensive consultation with APHIS, OBPA and other agencies with responsibility for program management.

For example, ERS developed a pest-ranking decision tool for APHIS to determine which pests would be on its 2004 and 2005 Federal-State Cooperative Agricultural Pest Survey (CAPS) list, making transparent the basis for selecting the pests for which State cooperators could receive targeted pest surveillance and detections funds. Also, the rapid spread of soybean rust in South America prompted ERS, in April 2004, to publish a study of the economic and policy impacts of its windborne entry into the United States. USDA used the ERS analysis in refining rapid response strategies when APHIS confirmed the presence of soybean rust on November 10, 2004 in Louisiana. ERS extended this work to examine the value to

producers of USDA's coordinated framework to detect and report the presence of Asian soybean rust in different producing areas and released a report in 2006.

In addition to ERS-led analyses of invasive species issues, PREISM allocated about \$6.8 million in extramural research cooperative agreements through a peer-reviewed competitive process in FY03-08. About \$1.1 million per year were allocated for extramural agreements in FY05 and FY06; \$950,000 was allocated in FY07 and \$970,000 in FY08. **No funds have been allocated since FY09. The last extramural research projects should be completed during FY13.**

PREISM-funded researchers are addressing important issues. For example, a Virginia Polytechnic Institute and State University research team collaborated with APHIS staff to analyze a rule to allow importation of avocados from Mexico, using a framework developed under a PREISM-funded agreement. The framework and economic analysis were published in the Federal Register with the APHIS rule. PREISM-funded researchers, as part of their projects, are collaborating with agencies to address invasive species issues and decisions, such as the coordination of prevention and control strategies for Brown Tree Snakes and *Miconia calvescens* in Hawaii, management of cheat grass, management of diseases transmitted between livestock and wildlife, insect resistance management in strawberry production, responses to outbreaks of foreign animal diseases, and prioritizing invasive plant management by public agencies. At the invitation of the Council on Food, Agricultural, and Resource Economics (C-Fare) and the Weed Science Society of America (WSSA), Muniswamy Gopinath (Oregon State U.) and Bruce Maxwell (Montana State U.) briefed congressional staff about their PREISM-funded projects on May 5, 2006.

ERS organized 8 workshops from 2003 to 2011 to provide forums for dialogue on economic issues associated with agricultural invasive species.

Following are some preliminary findings from PREISM-funded research projects:

- Prevention and management resources should be allocated to species and strategies with the highest return (in terms of damage reduction over time). Ideally, marginal benefits and costs should be equal across species and strategies.
- Decision-support tools that follow sound economic principles and reveal underlying scientific assumptions and value judgments provide a basis for expert and stakeholder involvement in decision-making and promote efficient allocations of funds.
- Optimal invasive species management strategies depend upon the stage of the invasion and associated rates of growth and spread. Eradication may be optimal for small invasions; reduction to a containment level for larger invasions. If eradication is feasible, the effort will reduce discounted damages more if it occurs early when populations are small. Delays result in more damages. If total cost increases rapidly as population increases, eradication when the population is small followed by prevention may be the best strategy.
- Under-funded eradication or management efforts can be cost-ineffective or wasteful, with little or no effect on invasive species growth and total damage. Higher initial expenditures can reduce long term damages and control costs, even if the species is not eradicated.
- For established invasive species infestations, per unit costs of removal can increase as populations decrease or become more isolated, making complete eradication difficult or cost-inefficient. In some cases, accommodation to low levels of invasion is economically preferable to the high cost of eradication. The higher is the cost of removal, the larger the residual population that will remain which will need increased surveillance and continual management.

- Higher invasive species infestation or population growth rates reduce benefit-cost ratios of control efforts, and at high enough rates, control might not be worthwhile. If population has surpassed that of maximum growth rate, the best strategy could be a pulse-like effort that drives populations below a critical population level and growth rate, followed by containment strategy.
- Probability of occurrence maps for invasive weeds based on GIS and other inventory or survey data and related population growth rates can improve weed management efficiency by reducing: 1) costs by targeting sites to monitor invasiveness, and/or 2) damage by initiating control of highly invasive populations before they spread.

Coordination of regulations across U.S.-Canada, State, and provincial boundaries could: 1) more effectively reduce the cross-border spread of exotic horticultural plants that become invasive, and 2) reduce incentives for cross-border firm relocations to take advantage of more lenient regulations.

Ecological and agronomic differences influence cross-State differences in noxious weed and weed-seed lists, but stakeholder lobbying also has significant effects.

Important PREISM outputs and accomplishments are documented in the 2003-2011 PREISM activities report (<http://www.ers.usda.gov/publications/AP/AP056/>).

Beginning in 2007, **NIFA's** National Research Initiative (NRI) Program, Biology of Weedy and Invasive Species in Agro ecosystems, has required an economic component in the integrated projects it funds. Specifically, the focus of such programs is the development, delivery, and implementation of ecologically-based, invasive species management programs (e.g. use of cover crops, grazing, tillage, and biocontrol agents) that include economic decision support tools to evaluate tradeoffs of different management strategies. A total of \$4 million was awarded such projects. This priority was continued in the

Agricultural and Food Research Initiative (AFRI) grants program in FY09 with an additional priority focusing on the abundance of weedy and invasive species and the individual and/or collective impacts of these species on a broad suite of ecosystem services, both market and non-market, and that can be used to evaluate tradeoffs of different management strategies. **Although the Biology of Weedy and Invasive Species in Agro ecosystems Program was discontinued in AFRI in FY10, a new grant program was offered through the AFRI Foundation Program in FY11, FY12 and FY13 entitled “Controlling Weedy and Invasive Plants”. This priority area supports projects that focus on compelling scientific questions underlying current issues in weed and invasive plant management in crops, managed forests and rangeland including:**

- Ecological processes related to integrated pest management;
- The evolution, spread and mitigation of herbicide resistance based on an understanding of ecological fitness and gene flow; or
- Other ecological or evolutionary studies that would inform weed management strategies, including links between agronomic practices and weed problems.

USFS researchers participated in a study that identified the key pathways for forest pest introductions as wood and wood products (especially common for wood boring insects, e.g. EAB) and live plant imports (the most common pathway for all other types of insect pests and pathogens. The study was funded by The Nature Conservancy, through the University of California at Santa Barbara’s National Center for Environmental Analysis and Synthesis.

At least 455 species of non-indigenous forest insects and diseases have established in the United States. The study identified 82 “high impact” insects or diseases that had caused significant damage to forests and determined the most likely pathway by which their invasion occurred. For these damaging non-native forest pests, approximately 69 percent can be attributed to the live plant trade.

Incoming plant shipments are inspected for pests, but the study found that because of the volume of incoming plants and limited personnel to inspect them, inspections often fail to detect infested shipments. This finding highlights the importance of the recent adoption of the

NAPPRA category, and a targeted inspection system. It further demonstrates the importance of implementing the integrated systems approach called for in NAPPO RSPM-24 and the new international standard for plants for planting.

The study was published April 1, 2012. Liebhold, A.M., Brockerhoff, E.G., Garrett, L.J., Parke, J.L., and Britton, K.O. 2012 Live plant imports: the major pathway for forest insect and pathogen invasions of the US. *Frontiers Ecol Environ* 2012; doi:10.1890/110198

Forest Service **researchers investigated the costs of oak wilt, a disease caused by a most likely introduced forest pathogen.** Over the next decade, in Anoka County, MN alone, depending on the rates of oak wilt pocket establishment and expansion, 76–266 thousand trees will be infected with discounted removal cost of \$18–60 million. Although these predictions of removal costs are substantial, they are lower bounds on the total economic loss from tree mortality because they do not estimate economic losses from reduced services and increased hazards. The predictions suggest that **there are significant economic benefits, in terms of damage reduction, from preventing new pocket establishment or slowing the radial growth of existing pockets.** Their results were published in FY 12: Haight, Robert G.; Homans, Frances R.; Horie, Tetsuya; Mehta, Shefali V.; Smith, David J.; Venette, Robert C. 2011. Assessing the cost of an invasive forest pathogen: A case study with oak wilt. *Environmental Management*. 47: 506-517.

For NRCS the economic analysis of the benefits of providing more funds for addressing invasive species versus other natural resource priorities is the responsibility of the individual NRCS State offices in their deliberations with partners in the individual State Technical Committees. Each State, through the input of all members of the State Technical Committee and the use of economic analyses, determines the natural resource issues that have the highest priority, and they commit their funds accordingly.

B. USDA progress on ISAC recommendations from the March 2004 meeting

2. ISAC recommendation: What are NISC agencies doing to avoid harm?

USDA has eight agencies included in its invasive species portfolio: Forest Service (FS), Natural Resources Conservation Service (NRCS), Animal and Plant Health Inspection Service (APHIS), Agricultural Research Service (ARS), Economic Research Service (ERS), Foreign Agricultural Service (FAS), Farm Service Agency (FSA), and National Institute of Food and Agriculture (NIFA, formerly CSREES, the Cooperative State Research, Education and Extension Service).

Securing input from the USDA agencies, the USDA Senior Invasive Species Coordinator created the USDA DO NO HARM REPORT, a report to ISAC and NISC, by fiscal year, including three categories of activities:

- a) Invasive Species Program activities USDA agencies are carrying out to do no harm;
- b) The way in which, when they do carry out other agency programs activities, they are also designed to do no harm; and
- c) A list of activities that ARE doing harm and the future actions the agency will take to change the activities so that they do no harm.

Within the above categories, agencies include their own activities as well as activities that are coordinated with other Federal agencies, per the mandate under the Invasive Species Executive Order.

The following Do No Harm reports have been presented to ISAC (meeting date in parenthesis):

- FY04 report NRCS, APHIS, ARS, CSREES & ERS (Oct. 04)
- FY04 report for US Forest Service (Feb. 05)
- FY05 report for NRCS, APHIS, CSREES, ERS & FS (Oct. 05)
- FY05 report for ARS (April 06)
- FY06 report for FS, NRCS, CSREES & ERS (May 07)
- FY06 USDA (APHIS) Do No Harm Report Part 2 (Oct. 07)
- FY07 USDA Do No Harm Report (May 08)

- FY08 USDA Do No Harm Report (May 09) for APHIS, ARS, ERS, CSREES, ERS, NRCS & USFS.
- FY09 USDA Do No Harm Report (Feb. 10) for APHIS, ARS, ERS, NIFA, ERS, NRCS & USFS.
- FY10 USDA Do No Harm Report (March 2011) for APHIS, ARS, ERS, NIFA, ERS, NRCS & USFS.
- FY 11 USDA Do No Harm report (dated February 2012) for APHIS, ARS, ERS, NIFA, NRCS & USFS.
- FY12 USDA Do No Harm report (dated 8 January 2013) for APHIS, ARS, ERS, NIFA, NRCS and USFS. A copy of the report is enclosed in the materials for ISAC's March 2013 meeting.

Copies of all the USDA reports are available online at <http://www.invasivespeciesinfo.gov/resources/orgfedusda.shtml>

3. **ISAC recommendation: NISC should request all Federal agencies to identify existing grant programs, cooperative agreements and other mechanisms that are potential sources of funds for invasive species projects.**

USDA compiled and published a comprehensive document in 2005 with grant opportunities for work on research, technical assistance or management of invasives. The document has been updated annually. The "2013 USDA Grant and Partnership Programs That Can Address Research, Technical Assistance Prevention and Control" was published December 12, 2012. ISAC members received copies. It has been distributed widely. Past reports are available at www.invasivespeciesinfo.gov

C. USDA Progress on ISAC recommendations from the October 2005 meeting

4. **ISAC recommendation: NISC policy liaisons provide guidance to ISAC Leadership and Coordination Subcommittee regarding issues the subcommittee should address.**

USDA would appreciate ISAC's support to (a) promote strengthening Federal collections, identifications and systematics efforts and capabilities; (b) promote increasing support for research (knowledge and models) and increasing the awareness of decision makers about the economic impacts of invasive species; and (c) strengthening research on invasive species and climate change.

During the winter 2011 ISAC meeting, USFS-NFS requested support from ISAC for development of their proposed Forest Service Handbook (FSH 2909.11). That request was accepted by ISAC. The USFS-NFS has moved forward to develop a formal agreement with the National Invasive Species Council for this ISAC assistance and the project is currently underway. USFS-NFS continues to coordinate closely with NISC and ISAC on the development of the proposed Forest Service Handbook (FSH 2909.11), particularly on content development for key chapters of the handbook under the purview of the ISAC subcommittees. Contact Mr. Mike Ielmini (USFS) or Ms. Lori Williams (NISC) for further details of this partnership.

D. USDA Progress on ISAC recommendations from the September 2006 meeting

5. ISAC recommendation: That NISC support adequate and continuing funding and staffing for classical systematics research, education and operations – including the care and maintenance of systematics collections.

Systematics clarifies the origins and movements of invasive pests, parasites and pathogens. Advances in biotechnology (including DNA sequencing, comparative genome analysis, distributed databases and high speed telecommunications) can substantially strengthen and accelerate governmental responses to these threats.

ARS funding for systematics:

FY 2008	\$20,935,632
FY 2009	\$21,189,347

FY 2010	\$21,982,411
FY 2011	\$20,135,727
FY 2012	\$19,956,277
FY 2013	\$19,937,059 (President's Proposed Budget)

Agricultural productivity depends on access to key inputs (rich soils, fertilizers, water, and energy), the inherent genetic potential of crops and livestock, and effective defenses against diseases, pests, and environmental extremes that reduce agricultural production and producer profitability. The capacity of agricultural research effectively rests on a dynamic foundation of invaluable living animal, plant, and microbial genetic resources, and research tools in the form of scientific collections of preserved biological specimens. Such scientific collections are essential for ARS scientists to advance the science of systematics. Funding to strengthen national collections proposed in the President's FY11 and FY12 budgets was not included in the final budgets enacted by Congress. Initiatives to support collections were not included in the President's FY13 budget.

A worldwide shortage of critical expertise in systematics was recognized and documented in a three-year analysis of the field. The 2008 situation report is available on the www.itap.gov Web site.

E. USDA Progress on ISAC recommendations from the May 2009 meeting

6. ISAC Recommendation: Establish the Sentinel Plant Network. Support and facilitate the establishment of the Sentinel Plant Network to facilitate the early detection reporting and prevention of pests and pathogens.

The **Sentinel Plant Network** is developing educational outreach materials for our member gardens to integrate into their interpretation and programming. These new resources will be debuted through a second series of regional professional development workshops in

2013. The Plant Heroes youth education program continues to grow and the educational outreach subcommittee is working to develop a more participatory citizen-science component of the program and to develop lesson plans / curriculum materials to facilitate the usage of Plant Heroes in formal educational settings.

They also launched some online discussion groups for six regional SPN chapters to allow member gardens and other stakeholders to share resources and communicate about emerging plant pest and disease issues.

SPN submitted a suggestion to APHIS for funding from FY13 Farm Bill Section 10201 to develop new train-the-trainer First Detector modules and educational outreach materials; provide additional training for public garden professionals on the front lines of early detection and forge partnerships between SPN gardens and their counterparts abroad for collaborative offshore monitoring.

USFS Forest Health Protection program is continuing a Sentinel Trees project in China. In China, the project is focusing on existing plantings of North American tree species of interest. The existing plantings occur in botanical gardens, nurseries, and plantations. The Forest Health Protection Program is not providing additional funding but has partnered with the Canadian Food Inspection Agency to carry on and expand the project. The implementation strategy for this project has three components; 1) looking at the grey literature for information on North American species of interest; 2) cataloging insects associated with selected host trees by trapping, chemical drenching, sweep nets or other techniques; and 3) periodic surveys of selected host trees. These projects develop techniques and procedures that we can use operationally in these and other selected countries.

7. ISAC Recommendation: Revise and draft NEPA guidance. ISAC recommends that NISC and the

Council on Environmental Quality (CEQ) revise and draft guidance under the National Environmental Policy Act (NEPA), and make it available for public comment by October 1, 2009.

USDA and APHIS participated in the latest review by NISC of the proposed invasive species guidance in 2009. The NISC staff has sent the report to CEQ and is awaiting CEQ action on it.

8. ISAC Recommendation: Provide data on NISC member agencies' invasive species budgets. ISAC recommends that NISC member agencies annually provide in writing at the fall ISAC meeting their invasive species budgets for the preceding fiscal year in actual dollars and the budget for the current fiscal year (requested and enacted). The budget document should be divided into seven categories: Prevention, EDRR, Control and Management, Restoration, Research, Education and Public Awareness, and Leadership/International Coordination.

Please see the updated budget report starting on **Page 38** of this document. It contains current information up to the FY13 President's proposed budget.

F. USDA Progress on ISAC recommendations from the June 2010 meeting

9. ISAC Recommendation: That agency partners submit their annual reports according to the deadlines specified in Performance Element OC.7.1.1 of the NISC 2008-2012 National Invasive Species Management Plan, which reads: *"Each NISC member submits one formal (draft and final) report per fiscal year, tracking the implementation of the NISC 2008 Plan. NISC Staff will complete a streamlined reporting template within three months. Annual summary report by NISC is available on its website by February 28 of each year along with the individual NISC member reports."*

USDA agencies submitted their reports on FY09, FY10 and FY11 (except USFS in FY11) related to their implementation of activities in the NISC Invasive Species Management Plan of 2008. At present, USDA agencies are compiling their accomplishments of activities for the FY12 report. NISC has not published the report tracking all NISC agencies accomplishments implementing the Plan.

10. ISAC Recommendation: That NISC adopts the Invasive Species and the Green Economy paper and recommendations within (see below).

We (ISAC) call on the member Departments and Agencies of the National Invasive Species Council (NISC) and potential partners to:

□ Establish a national survey of invasive species, to be administered at the state-level. Support this program by substantially increasing Federal and state jobs at all technical levels to survey, identify, map, catalog, and model patterns/trends of invasive plants and animals. Include the existing state and regional invasive species committees/councils in the development and implementation process. Place priority on invasive species known or projected to have substantial impacts.

APHIS assists state partners via its National Cooperative Agricultural Pest Survey Program which uses appropriated funds and with funds from Section 10201 of the Farm Bill.

The Cooperative Agricultural Pest Survey (CAPS) Pest Detection program strengthens APHIS' emergency preparedness efforts through the early detection of exotic, harmful, or economically significant plant pests, pathogens, and noxious weeds. Discovering these pests before they spread can prevent small outbreaks from becoming emergencies. APHIS and its State cooperators carry out surveys for pests of regulatory significance through the CAPS program. The CAPS Program enables APHIS to maintain a

comprehensive network of cooperators and stakeholders to facilitate its mission of safeguarding America's plant resources. In FY12, State cooperators were funded a total of \$6,842,911 through the CAPS program, and targeted 264 pests, pathogens, and noxious weeds in 133 commodity- and taxon-based surveys nationally. A total of 19 pests and pathogens were detected (either through CAPS surveys or reported to APHIS) and recorded in an APHIS database as new or re-introduced to the United States. All 19 of these pests (100%) were significant and listed as reportable/actionable and as quarantine pests at the time of their detection. Examples include *Arocatus melanocephalus* (Elm seed bug) in Idaho, *Anguina funesta* (Seed gall nematode) in Oregon, *Mycosphaerella morindae* and *Guignardia (Phyllosticta) morindae* (leaf-spotting fungi) in Hawaii, and *Cylindrocladium pseudoaviculata* (Boxwood blight fungus) in North Carolina. Overall, the program detected 79% of the known significant introductions of plant pests or diseases before they spread from the area of original colonization and caused significant economic or environmental damage. The program is continuing to develop commodity-based and resource-based surveys. These surveys enable the program to target high-risk hosts and commodities, gather data about pests specific to a commodity, and establish better baseline data about pests that were recently introduced in the United States.

Section 10201 of the 2008 Farm Bill directs the Secretary of Agriculture to make available \$50 million to APHIS from Commodity Credit Corporation for early plant pest detection and surveillance, for threat identification and mitigation of plant pests and diseases, and for technical assistance in the development and implementation of audit-based certification systems and nursery plant pest risk management systems. In FY12, APHIS funded 345 projects with hundreds of cooperators in 50 state departments of agriculture, universities, other agencies in USDA, and non-profit organizations. Of the many projects funded, examples include: surveys for pests of national significance such as plum pox virus, *Phytophthora ramorum*,

grape pests (including the European grapevine moth), and honey bee pests; training canine teams for domestic survey detection activities in California, and for detecting snails in cargo and rail yards; developing, provide training for, and deploying survey procedures and tools that improve our ability to rapidly detect and accurately identify pests of regulatory significance, and development and implementation of a National Survey Supply Program to oversee timely procurement and delivery of quality survey supplies to APHIS field personnel and State cooperators; developing science-based, best-management, and risk-mitigation practices that exclude, contain, and control regulated plant pests from the nursery production chain as well as developing and harmonizing audit-based nursery certification programs, and supporting ongoing work on control and management practices for *Phytophthora ramorum* at the National Ornamentals Research Site at the Dominican University of California; developing formal volunteer programs for exotic pest surveillance, such as the Northeast Forest Pest Outreach and Survey Program, and outreach to Tribal Nations across the U.S.; and supporting mitigation efforts for fruit fly outbreaks in Florida and California and plum pox eradication in New York, as well as applied research on citrus pest mitigation. Over the last several years, Section 10201 projects such as these have played a significant role in many USDA successes in protecting American agriculture and educating the public about the threat of invasive species. Section 10201 funding directly strengthens and protects agriculture production and protection in all 50 States. This Farm Bill provision truly supports and enhances the Federal/State partnership in safeguarding the agriculture production capacity of the United States.

US Forest Service R&D's Forest Inventory and Analysis group now includes invasive plants in their normal monitoring procedure. The list of plants included in the survey varies by region. A guide produced to help identify the 44 plants inventoried by the Northern Region, can be viewed at: <http://www.treesearch.fs.fed.us/pubs/34183>. Six FIA invasive plant state survey results were published, and can be obtained from the TreeSearch website www.treesearch.fs.fed.us

A report on the results of surveys in the Southern Region can be viewed at: <http://www.invasive.org/fiamaps/>. Custom maps can be generated using the FIDO tool at: <http://apps.fs.fed.us/fido/> USFS Forest Health Protection program also provides states with funding for surveys of priority pests.

The **National Resource Planning Act Assessment** was recently released, which every ten years outlines the state of the nation's forest resources and trends in forest resource use. The new report can be accessed at: <http://www.treesearch.fs.fed.us/pubs/41976/>

The **Southern Future Forests** project published a report outlining predicted influences of changing climate, land use patterns and demographics on invasive plants, insect pests and diseases. The report is published at: <http://www.srs.fs.usda.gov/futures/reports/draft/Frame.htm>

A similar project is underway to predict conditions and challenges in the 20 northeastern States.

The **USDA Office of the Inspector General** has notified the USFS that it is closing Audit Number 08601-7-AT on the invasive species program. The USFS and the Inspector General reached agreement on all OIG's recommendations in the audit and the USFS has satisfied all requirements related to the recommendations and related action items. One of the recommendations by the OIG was to survey/inventory all National Forest System lands and waters for invasive species. Through the new policy direction and future handbook guidance, the USFS-NFS will work toward that goal.

The **NRCS** maintains, through its National Plant Data Center in Greensboro, NC, the **PLANTS database** (<http://plants.usda.gov>) which, in addition to providing up-to-date descriptive and distribution information for plants of the U.S., provides invasive species lists for all States and references for more information about each of the invasive species. The PLANTS data is used as an authoritative source for the invasive plants in the U.S. by the global Invasive Species Compendium.

□ Supplement the Federal and state workforce by creating contract jobs in the private sector and offering grants to encourage business innovation and entrepreneurship (e.g., native plant and seed companies, ecosystem restoration, invasive species mapping and control services, and education/outreach programs).

USFS-National Forest System has outlined a national approach to creating job opportunities in the private sector to detect, prevent, control, and eradicate aquatic and terrestrial invasive species across the National Forest System. This proposed approach capitalizes on the growth of the invasive species management industry and the large amount of work that is not inherently governmental. The approach also built job-creating partnerships to help raise awareness in the communities about the threat of invasive species to the national economy. In addition, over \$1 million in grants were awarded by the National Forest System invasive species program in cooperation with the National Fish and Wildlife Foundation's Pulling Together program for the establishment and support of Cooperative Weed Management Areas. Each of these grants provide funding for hiring personnel in the local communities to manage invasive plants and build cooperative efforts in the community.

The NRCS, with funding through its Environmental Quality Incentives Program (EQIP), provides support for Technical Service Providers (TSPs). TSPs are individuals or businesses that have technical expertise in conservation planning and design for a variety of conservation activities, including management of invasive species. TSPs are hired by farmers, ranchers, private businesses, nonprofit organizations, or public agencies to provide these services on behalf of the Natural Resources Conservation Service (NRCS). Each certified TSP is listed on the NRCS TSP online registry, TechReg. The TSP registration and approval process involves required training and verification of essential education, knowledge, skills and abilities.

□ In order to counter the dramatic decline in taxonomic capacity (i.e. the decrease in the number of people trained to identify specific species), provide grants to support research/education/training in taxonomy as well as job creation

for taxonomists and parataxonomists (people who lack formal higher-level education, but who are trained to undertake species identification tasks).

In FY12, the following taxonomic related products were developed and deployed to the APHIS PPQ's programs and external partners: **Trade-based digital identification resource** (Table Grape Resource, Table Grape Spider ID, and Table Grape Weed Disseminule ID); **Commodity-based digital identification resource** (Citrus Resource, Citrus Diseases ID, and Citrus ID); **Taxon-based digital identification tools** (Flat Mites of the World and Tortricids of Agricultural Importance); and a major update to a **portal of digital aids for plant protection and quarantine (ID Source)**. Job aids have been produced to support the Cooperative Agricultural Pest Survey and to identify adult and larval Khapra beetle.

APHIS **International Services (IS)** distributed the new products and **Lucent taxonomic keys to international partners** (i.e., IICA, FAO, CARDI, CABI, OIRSA) and NPPO counterparts via IS offices overseas. IS also forwarded the new identification materials/links to the University of Florida (UF) for dissemination to the diagnosticians in the Caribbean Pest Diagnostic Network (CPDN) (which includes five countries where IS provided distance diagnostic equipment). The new keys were included in the resource materials provided to participants in the Regional Plant Quarantine Officers class funded by PPQ Greater Caribbean Safeguarding Initiative (GCSI) and given at the University of the West Indies (UWI) in Trinidad (in 2011 and 2012).

IS organized **numerous capacity building trainings and workshops to train international NPPO inspectors and identifiers, to enable them to identify new pests entering their countries or to identify indigenous pests in phytosanitary export inspections (prior to export to the U.S.).**

Examples:

South America: Projects included Asian Gypsy Moth Surveillance in Chile and a Giant African Snail Workshop/Training in the southern half of South America, working with Ministries in the Central American Region to reduce the number of pest interceptions on agricultural commodities exported from these countries and on surveillance

programs for the detection of *Anastrepha grandis*. and *Tuta absoluta* in the Central America and Caribbean region.

Caribbean: IS participates and encourages a wide range of activities focusing on forming a regional phytosanitary forum, technical working groups (TWG), and in particular safeguarding training and infrastructures, including an update and revision of existing confirmed Tephritid Fruit Fly (TFF) distribution within the wider Caribbean. Other recent capacity building activities include a regional workshop on the identification of Lepidopteran pests, GAS and other Molluscs, Thysanoptera training, Tephritid training, and an audit of Caribbean national fruit fly survey systems, including three expert visits, with improvements to trapping as a result.

Asia: During 2003-06 Highly Pathogenic Avian Influenza (HPAI) seriously impacted on poultry health and human health in many countries in Southeast Asia. To successfully control HPAI among poultry and humans, APHIS helped educate farmers in biosecurity in their farms and promote public awareness on HPAI and other zoonosis.

□ Capitalize invasive species prevention and management needs (e.g., along roadways and on government lands) to create entry-mid level, high impact social development programs for youth and persons at risk (e.g., minimum security prison population). Establish Federal initiatives and/or offer grants to states and tribes.

NRCS district offices (one office in almost every U.S. county) work very closely with the local community in addressing natural resource issues of the area, including invasive species. Opportunities for social development at the local level also exists through the NRCS “Earth Team” volunteer program (see <http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/people/volunteers>).

Also, through the Conservation Innovation Grants (a program within the Environmental Quality Incentives Program (EQIP)), **state or county organizations and others may propose social development programs as long as EQIP-eligible landowners are involved.**

USFS-National Forest System is currently building new directives which require proactive management of invasive species in the National Forest System, and across the broader landscape, with the goal of restoring the condition of degraded watersheds. The new manual and accompanying handbook will provide the policy foundation on which to build long lasting opportunities to engage with youth and other external workforce groups. Although funding levels have decreased, State and Private Forestry matching funds for invasive plants control provide employment opportunities through a variety of local programs, such as those administered by cooperative weed management organizations.

□ Substantially increase Federal and state agency staffing in the areas of import/border inspection for agriculture and wildlife, specimen identification, pest risk analysis (including pre-import screening), and invasive species program management (especially public education/outreach, regulatory enforcement, and early detection/rapid response).

DHS/Customs and Border Protection (CBP) continues to place more emphasis on agriculture pest detection. Training was provided to CBP Agriculture Specialists to place higher priority and increase ability to detect forest pests that are entering in wood packing material. APHIS works with CBP to help develop training that increases their ability to detect invasive species. APHIS SITC (law enforcement) continues to increase collaboration with CBP to do internal investigations on international cargo beyond port environs.

New weed risk analysis methodologies have been developed and validated on over 200 known species. These methods are currently being implemented as part of a suite of risk analysis approaches designed for the regulations for the import of propagative material and also to identify species which may be regulated as Federal Noxious Weeds.

Establishment of NAPPRA plants for planting category– In May 2011, PPQ established a new regulatory category called NAPPRA (not authorized pending pest risk analysis) for plants for planting (nursery stock) that pose a quarantine pest risk; these plants may no longer be imported unless PPQ first conducts a pest risk analysis

(PRA). NAPPRA is a huge shift in plants for planting policy for the USDA. It allows PPQ to quickly take action to regulate the importation of plants that could pose a pest risk to the U.S. and then conduct a PRA to ensure that all pest risks are addressed before the plants are brought into the country. Few plants for planting PRAs have been conducted in the past. NAPPRA makes plants for planting restrictions more similar to current requirements for fruit and vegetables. Also in 2011, PPQ made available for public comment the first round of NAPPRA taxa: 41 taxa of plants for planting as quarantine pests and 107 as hosts of quarantine pests. PPQ has published the final first list of NAPPRA taxa which will no longer be allowed to be imported until we complete a PRA.

Simultaneously, APHIS prepared a second round of approximately 20 additional quarantine pest plants and approximately 30 hosts of quarantine pest plants that the agency has proposed, with a Federal Register notice, to add to the NAPPRA list. Again there was a public comment period and a response to public comments before APHIS started enforcing additional import restrictions on those taxa.

APHIS work in exporting countries to prevent introductions of invasive species to the U.S. - APHIS IS works with foreign counterparts to strengthen their ability to inspect shipments prior to export and phytosanitary certification.

USDA APHIS POP (Preclearance and Offshore Programs) in the Netherlands encounters potential invasive species through the preclearance inspections of bulbs and perennial plants, so infested materials are reconditioned or rejected for export to the U.S.

□ Establish/strengthen internships in invasive species identification, control/eradication, mapping, and monitoring for high school and college students. Support comparable Federal, state, tribal, and non-profit initiatives.

Many ARS laboratories employ and train students at various levels of their education in current technologies used in research. In addition, ARS has numerous cooperative agreements with university scientists who employ and train students at the undergraduate and graduate

level in various areas of research that utilize modern technologies applicable to solving issues related to invasive species.

USFS State and Private Forestry Program provided support in FY12 to EDD Maps (see <http://www.eddmaps.org/>) effort for use nationwide by cooperators, including Cooperative Weed Management Associations, and students groups, for mapping and monitoring invasive plants.

USFS National Forest System units are collaborating with local landowners, state governments, NGO's and other partners to collect and record invasive species infestation data associated with populations located on national forests and grasslands. Invasive species inventory data (including spatial data) recorded in the USFS Natural Resource Information System (NRIS) database is being shared with external partners using a new batch-loading approach to transfer information beyond the security firewalls.

In order to address expected gaps in diagnostic expertise, APHIS provided \$100,000 in FY12 to the University of Florida for a systematics internship program. NIFA and the National Plant Diagnostic Network were cooperators in implementing the program. APHIS worked with morphological taxonomic experts in microlepidoptera, bark beetles, flat mites and general plant pathogenic fungi and specific Fusarium diseases. The internships were advertised through the American Phytopathologic Society and the Entomologic Society of America.

□ Develop stronger relationships between the Federal government and green industries potentially impacted by and/or managing invasive species. For example, work with the Invasive Species Advisory Committee (ISAC) and/or NISAW to organize an Invasive Species & Green Industries Summit.

□ Mandate that, prior to receiving Federal support: 1) renewable energy projects (esp. solar, wind, and biofuel) have adequate invasive species mitigation plans in place and 2) biofuel developers/producers demonstrate that nonnative species are of low invasion risk (to the propagation site, area of potential

dispersal, and along transport pathways) based on a competent invasive species risk analysis.

Any funding provided to private landowners by NRCS includes the requirement for conservation plans, a part of which is an assessment of the risk of invasive species and a plan for mitigating negative impacts from invasive species.

USFS-National Forest System has completed and issued new policy (Forest Service Manual 2900) which will require invasive species management considerations to be part of all planning and implementation of energy development and transmission programs, transportation, and other land management activities conducted on the National Forest System. The new policy will prohibit the use of invasive species for bio-fuels production on National Forests and Grasslands.

G. USDA Progress on ISAC recommendations from the December 2010 meeting

- 11. ISAC Recommendation: That NISC member agencies such as the Army Corps of Engineers, the Department of Agriculture (ARS and APHIS), and others, expand biological control efforts for invasive species, and in particular those in aquatic systems, which tend to have limited options that are often very costly. These efforts are justified based on economic analyses that suggest an average beneficial return of 10-17 fold for each dollar spent on biological control.**

APHIS' Biological Control program has provided funding in both FY11 and FY12 to the U.S. Army Engineer Research and Development Center (ERDC) unit for the management of the invasive aquatic weed, *Hydrilla verticillata*, in the St. Johns River Water Management District (SJRWMD), Florida. The main objective of this cooperative effort is to implement a holistic, ecosystem-based, integrated approach for the management of hydrilla at several sites in the SJRWMD. This effort includes the use of a host-specific biological control agent to reduce the invasive characteristics of hydrilla. It also

includes a re-vegetation program that will reduce the occurrence of empty niches, act as nutrient sinks, and increase competitive pressure on hydrilla in order to produce a long-term self-sustaining management approach.

APHIS IS Mexico has worked closely with the Mexican Ministry of Agriculture to **eradicate Hydrilla from the Mexican side of the border (1985-2010) in irrigation canals. The program was closed with successful eradication.**

In FY12, USFS published studies on biological control research for the following invasive species: emerald ash borer, gypsy moth, hemlock wooly adelgid, miconia, mile-a-minute weed, yellow toadflax, yellow starthistle, and cheatgrass.

A petition was filed to release *Rhinusa pilosa* as a biological control agent for yellow toadflax.

FS also published the Proceedings of the XIII International Symposium on the Biological Control of Weeds.

12. ISAC Recommendation: NISC member agencies continue to support and encourage participation in National Invasive Species Awareness Week (NISAW).

USDA, NRCS, NIFA, USFS, ARS and APHIS were active participants in the 2012 NISAW activities. USDA agencies will continue participating in NISAW in the future.

13. ISAC Recommendation: That NISC adopts the Invasive Species and the Climate Change paper and recommendations within.

Invasive Species and Climate Change

Approved by ISAC on December 9, 2010

Issue

Climate change interacts with and can often amplify the negative impacts of invasive species. These interactions are not fully appreciated or understood. They can result in threats to critical ecosystem functions on which our food system and other essential provisions and services depend as well as increase threats to human health. The Invasive Species Advisory Committee to the National Invasive Species Council recognizes the Administration's commitment to dealing proactively with global

climate change. However, unless we recognize and act on the impact of climate change and its interaction with ecosystems and invasive species, we will fall further behind in our effort to prevent, eradicate and manage invasive species. We are already seeing such climate change impacts and need to act now.

Decisive Action is Required

Policy makers at all levels of government must integrate invasive species considerations into climate change policies. The strong interrelationships between climate change and the dynamic nature of invasive species, changing ecosystems, and human activities necessitate such integration. It is critical that practices be developed that strengthen environmental monitoring, management and control of invasive species to minimize impacts on the broad range of ecosystem resources upon which humans depend. The physical process of climate change interacts with the biological and physical processes of the earth's ecosystems, and these are, in turn, linked to the socio-economics of human activities.

Background

Climate change and biological invasions are dynamic, interconnected and interdependent phenomena. They affect human health and well-being through their impact on resources, goods and services provided by ecosystems. These ecosystems are critical to agriculture and forests, food security, water supplies and other natural resources. They affect wildlife, recreation, and public health and safety nationwide. Even without climate change, invasive species have repeatedly and rapidly disrupted many ecosystems in the US. While climate change may have either a positive or negative effect on individual invasive species, which can be projected in various models, it is likely to have a negative effect on many specialist native species that are more restricted in their ranges. Invasive species often show higher ability to acclimate to environmental change compared to related native species. Thus, invasive species that tend to be more adaptable are expected to expand and further compromise sensitive native plant and animal communities.

The ongoing change in climate and the expected speed of this change are likely to exacerbate problems by increasing the ability of invasive species to become established, spread through, and disrupt ecosystems. At a minimum, invasive species can reshuffle the landscape for agricultural services and resources including food, fuel, feed, fiber and forests along with quickly changing land use decision pressures. As a parallel, in marine and/or aquatic ecosystems, climate change can induce fisheries collapse as mid-trophic structure species are lost opening new potential niches for tolerant invasive species. Finally, climate induced shifts in invasive disease vectors, such as those for malaria or avian flu, are of increasing concern.

Evidence indicates that climate change may alter the efficacy of management strategies for invasive species. Furthermore, changes in land cover caused by invasive plants can influence weather and climate. In some regions, both climate change and invasive species are likely to increase the frequency of wildfires which in turn will further facilitate the establishment of fire adapted invasive species leading to even more frequent and intensive fires.

Recommendations

Policy and Legal Responsibilities

We applaud the U.S. Department of Interior's establishment of a Climate Change Response Council to synthesize data and coordinate appropriate management of our nation's lands and waters. We acknowledge the U.S. Department of Agriculture's (USDA) recent presentation of the impact of climate change in its publication: *"Effects of Climate Change on Agriculture, Land Resources, Water Resources, and Biodiversity in the United States."* We fully support the Department of Commerce's National Oceanographic and Atmospheric Administration's (NOAA) proposal to establish the NOAA Climate Service to meet essential national needs.

Executive Order 13112 requires Federal agencies to address invasive species and establishes the National Invasive Species Council to coordinate planning and response. The International Plant Protection Convention requires analyses of pest risk. Agencies may be able to integrate climate change considerations into their existing risk-assessment protocols and procedures. Environmental laws such as the Endangered Species Act and the National Environmental Protection Act (NEPA) can be used more powerfully to address invasive species.

Opportunities for Action

We call on the member Departments and Agencies of the National Invasive Species Council and potential partners to:

ISAC Recommendation: Use the Global Change Research Act of 1990 (GCRA)48 (PL 101-606) to aggregate information about the implications of a changing climate for invasive species spread so scientific data may be synthesized through existing authorities to inform policy-makers.

ARS includes invasive species as part of its climate change research program. Invasive species research is also conducted in plant and animal production research programs. The ARS climate change research program includes synthesis activities specifically designed to inform policy-makers.

USFS Research & Development has published a synthesis of the literature on interactions of climate change and forest diseases, which can be viewed at: <http://www.treesearch.fs.fed.us/pubs/33904>. USFS researchers co-authored a paper in the Feb 2011 special edition on Climate Change of the journal "Plant Pathology", which can be viewed at: <http://onlinelibrary.wiley.com/doi/10.1111/j.1365-3059.2010.02406.x/abstract>

USFS Research & Development is devoting significant resources to understanding how climate change affects bark beetle life history and tree responses to attack. A synthesis paper is accessible at: <http://www.treesearch.fs.fed.us/pubs/36133>

ISAC Recommendation: Streamline and focus agency programs

to address invasive species climate interactions effectively and efficiently by establishing:

- 1) strategic plans that anticipate climate impacts on invasives,

The **USDA Climate Change Science Plan** includes invasives as a part of Element 1: Understand the direct and indirect effects of climate change on natural and managed ecosystems, including feedbacks to the climate system, and Element 2: Develop knowledge and tools to enable adaptation to climate change and to improve the resilience of natural and managed ecosystems. ARS includes invasives as part of its Climate Change, Soils and Emissions National Program Action Plan as part of Component 3: Enable agriculture to adapt to climate change with Problem statements of: Understand the responses of agricultural systems to anticipated climate change, and Understand the impact of anticipated climate change on endemic and exotic pests, weeds and diseases.

In **FY12 all USDA agencies prepared an agency's Strategic Action Plan on Climate Change and designated an agency Climate change Coordinator. Action Plans are being implemented.**

- 2) forward-looking environmental compliance documents (e.g., NEPA, nationwide Environmental Impact Statements on invasives prevention, management, and restoration)

ARS research projects follow the procedures described in the Code of Federal Regulations Title 7, Subtitle B, Chapter V, Part 520 for implementing the National Environmental Policy Act. These procedures assure that research and other activities of the Agricultural Research Service (ARS) comply with the intent of the National Environmental Policy Act of 1969 (NEPA) and appropriate regulations implementing this Act. These procedures incorporate and supplement, and are not a substitute for, CEQ regulations under 40 CFR parts 1500-1508, and Department of Agriculture NEPA Policies and Procedures under 7 CFR part 1b. ARS conducts and supports research as authorized by legislation to support one of the USDA goals of assuring adequate supplies of high quality food and fiber. Information generated through such research often forms the basic data needed to assess the impact of a new technology upon the environment. Large scale projects simulating commercial practices

are normally implemented in cooperation with other agencies of the Federal or State Governments.

APHIS has developed internal guidance for incorporating climate change into NEPA documents to address greenhouse gases and impacts of climate change per Executive Order 13514. APHIS also provided support for the development of the national adaptation strategy on fish, wildlife and plants under the direction of CEQ and USFWS. APHIS provided several observations and recommendations on the action of climate change as a disturbance facilitating the establishment and expansion of exotic invasive pests, pathogens and weeds.

and,

3) focus awareness programs to anticipate and manage potential climate driven ecosystem changes.

ARS conducts research on the effects of anticipated climate-driven ecosystem changes. Laboratory, plot-level, landscape, and simulation-focused research are focused on developing risk management tools to maintain the resilience of agricultural systems and the natural resources base (water, soil, air) needed to maintain production and ecosystem services.

ISAC Recommendation: Assess new climate driven invasion pathways and strengthen prevention programs to address invasives in ballast water, bio-fouling, interstate and international movement of materials and equipment (e.g., energy development, wildfire response, national defense), and screening of plant and animal imports taking account of climate impacts.

ARS conducts basic and applied research on the interacting effects of climate change on endemic and exotic pests, weeds and diseases. Resistance to management actions designed to control these types of species is being addressed. ARS is also working with APHIS to identify research needs to develop risk-management technologies based on climate events for early warning of outbreaks.

It is the goal of APHIS Veterinary Services to use climate impacts to adjust our risk-based inspection of animal and animal product imports. APHIS has assisted other countries with early warning of

outbreaks (based on climate events such as El Nino), which reduces our risk of introducing pests and diseases in imports.

ISAC recommendation: Support monitoring and adaptive management programs for invasive species at the landscape scale so that natural resource managers can identify new threats and respond quickly and appropriately to invasive species in changing climatic conditions.

ARS is conducting research on remote sensing technologies to enable mapping and tracking of invasive species and the effectiveness of eradication measures.

USFS Research & Development is developing a collaborative and inclusive agency inventory, monitoring and assessment strategy (expect publication in FY13). This is needed to help implement the new National Forests Planning Rule.

USFS-National Forest System has expanded its corporate record keeping system and integrated survey and inventory information with treatment records to help provide critical information for adaptive management against invasive species. New USFS policy (Forest Service Manual 2900 (and the future Forest Service Handbook) requires use of a structured decision making process and an adaptive resource management approach when dealing with invasive species.

ISAC Recommendation: Foster collaboration of existing networks to address the broad geographic nature and altered management of invasive species issues in a time of climate change. This will allow the national response to be coordinated, efficient, and capitalize on current capacities using a synergistic approach.

ARS and APHIS have members in FICMNEW (Federal Interagency Committee for Management of Noxious and Exotic Weeds) and ITAP (federal Interagency Committee on Invasive Terrestrial Animals and Pathogens) to inform other Federal agencies of research activities on invasive species and to coordinate efforts among agencies.

ARS and APHIS are having discussions about the importance of considering issues related to pests/pathogens/weeds as the USDA continues to develop its plans and responses to climate change. In FY12 APHIS continued to cooperate with ARS and other members of

the federal interagency committee on noxious and exotic weeds (FICMNEW) as members of an invasive species working group that addresses climate change as it affects weeds and other invasive species.

ISAC Recommendation: Increase research and development

targeted at climate change and invasive species by supporting and expanding the USDA-ARS and US Forest Service Climate Change Programs, as well as competitive research programs such as USDA's Agricultural and Food Research Initiative, the Environmental Protection Agency's Project Grants, NSF's Conservation and Biology program, and NOAA's Sea Grant program. Better understanding of the interaction of climate change and invasive species will result in more relevant prioritization and management on the ground. This includes recognizing the economic basis for invasive species management decisions and supporting work that integrates economic, ecological and biological data providing policy and management support.

ARS is continually examining its portfolio of research projects relevant to climate change and invasive species. The goal is to expand an informal working group of ARS scientists focused on climate change and invasive species for the purposes of increasing opportunities for collaboration.

In FY13, NIFA continues to offer funding opportunities to address climate change. This new Challenge Area is entitled: Agriculture and Natural Resources Science for Climate Variability and Change. This Challenge Request for Applications (RFA) focuses on the societal challenge to adapt agro ecosystems and natural resource systems to climate variability and change and implement mitigation strategies in those systems. In the Agriculture and Natural Resources Science for Climate Variability and Change Challenge Area RFA, specific program areas are designed to achieve the long-term outcome of reducing the use of energy, nitrogen, reducing GHG emissions from practices, and water in the production of food, feed, fiber, and fuel; reduce GHG emissions from these agro ecosystems; and increase carbon sequestration. Project types supported by AFRI within this RFA include multi-function integrated research, education, and/or extension projects and Food and Agricultural Science Enhancement (FASE) Grants.

Other sources of NIFA funding for work relevant to the Agriculture and Natural Resources Science for Climate Variability and Change Challenge Area are as follows:

- *Dual Purpose with Dual Benefit: Research in Biomedicine and Agriculture Using Agriculturally Important Domestic Species* (joint with the National Institute of Health (NIH)).
Total Program Funds: Approximately \$5 million from AFRI.
Information is available at
<http://nifa.usda.gov/fo/researchinbiomedicineandagricultureafri.cfm>
- *National Robotics Initiative* (joint with National Science Foundation (NSF), NIH, National Aeronautics and Space Administration (NASA), and Department of Defense (DoD)).
Total Program Funds: Approximately \$5 million from AFRI. Information is available at
http://nsf.gov/funding/pgm_summ.jsp?pims_id=503641
- *Plant Feedstock Genomics for Bioenergy* (joint with Department of Energy (DOE)).
Total Program Funds: Approximately \$2 million from AFRI.
Information is available at
www.nifa.usda.gov/fo/plantfeedstock.cfm
- *Ecology and Evolution of Infectious Diseases* (joint with NIH, NSF, and the U.K. Biotechnology and Biological Sciences Research Council (BBSRC)).
Total Program Funds: Approximately \$2.5 million from AFRI.
Information is available at
<http://nifa.usda.gov/fo/ecologyandevolutionofinfectiousdiseases.cfm>
- *Water Sustainability and Climate* (joint with NSF)
Total Program Funds: Approximately \$5 million from AFRI.
Information is available at
http://www.nsf.gov/publications/pub_summ.jsp?WT.z_pims_id=503452&ods_key=nsf11551

- *Decadal and Regional Climate Prediction using Earth System Models (EaSM)* (joint with NSF)
Total Program Funds: Approximately \$5 million from AFRI.
Information is available at
http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=503399

Congress cut USFS Climate change research program in FY12 by 10%. USFS is still waiting to hear about FY13.

ISAC recommendation: Use climate matching and ecological niche models to prioritize management of species that are most likely to cause the greatest harm in the future as a result of climate change. This will require the Federal response to be coordinated, empowered, and appropriately funded.

ARS responds to priorities for research gathered from customer-stakeholder workshops, science collaborators and Federally-mandated priorities.

NRCS has historically been a key source of this information for ARS. NRCS with its partners have developed tools to estimate the amount of carbon stored and GHG emissions reduced at the field and producer level. [COMET-VR](#) is a web-based, interactive decision support tool that includes the effects of land-management changes and is authorized for voluntary GHG reporting under section 1605(b) of the 1992 Energy Policy Act. It is a cooperative effort between NRCS and Colorado State University. Tools like COMET-VR make it easier for producers to estimate carbon storage and GHG emissions reductions for their entire holdings. The market for carbon credits trading in the form of carbon emissions reduction is in its formative stages and agricultural producers stand to benefit. NRCS has also instituted an Environmental Credit Trading Information Series to answer basic questions in environmental trading. The first document in the series discusses [Carbon Credit Trading on Rangeland](#).

ARS is currently in dialogue with APHIS concerning priorities for research and development of relevant technologies.

H. USDA Progress on ISAC recommendations from the June 2011 meeting

14. ISAC Recommendation: To enhance the effectiveness of biological control programs at their inception, ISAC recommends that NISC Departments and Agencies working on biological control of invasive organisms, plan, conduct, and evaluate their programs in the context of an Integrated Pest Management (IPM) approach. This may require integrating biological control in concert with other management options (i.e., physical, cultural, and chemical) to achieve maximum effectiveness. For example, many invasive species are susceptible to both biological control agents and competitive interactions. As a result, using these approaches in concert can provide synergy towards achieving the desired land management objectives. ISAC has previously recommended an IPM approach to invasive management strategies. While most biological control efforts often consider themselves a stand-alone, silver bullet solution, a more integrated approach should increase the probability of success.

This recommendation addresses the National Invasive Species Management Plan, Implementation Task CM.1.2:

Identify and address strategic gaps in regional invasive species control and management efforts and tools.

In support of the USDA's Integrated Pest Management (IPM) goals and other IPM needs, ARS currently conducts more than 144 IPM research projects at 56 locations that are focused on minimizing pesticide inputs through the development of classical and augmentation biological control, cultural control, host-plant resistance, behavior modifying chemicals (e.g., pheromone mating disruptors and attracticides), sterile insect release techniques, resistance management, cultural and mechanical practices, improved pesticide application technologies, and other related pest control tactics. Target pests include a multitude of insects, mites, and ticks; plant pathogens and nematodes; and weeds.

In addition, ARS funds the Areawide Pest Management Program, which supports 5 to 10 multi-year IPM projects to facilitate the implementation and adoption of ARS-developed IPM technologies to control or suppress agricultural pests over multi-state or multi-

regional areas through partnerships with growers, commodity groups, and State institutions, Federal and State agencies, and the private sector. Past Areawide projects have supported the suppression of economically important pests such as codling moth in the Pacific Northwest, corn rootworm in the Midwest, leafy spurge in the Northern Plains, stored grain insects in the Midwest, tephritid fruit flies in the Hawaiian islands, fire ants in the Southern U.S., Russian wheat aphid and greenbug in the Great Plains, tarnished plant bug in Louisiana and Mississippi, and *Melaleuca* in the Florida everglades.

Current Areawide projects include:

- Methyl Bromide Alternatives for fruit and nut production in California and Florida (2007-2012);
- Weedy annual grasses on rangelands, such as cheatgrass (*Bromus tectorum*) and medusahead (*Taeniatherum caput-medusae*), in the Great Basin ecosystem of the United States (2008-2012);
- The Asian tiger mosquito (*Aedes albopictus*) and West Nile virus, with initial demonstration sites located in New Jersey (2008-2012);
- The navel orangeworm (*Amyelois transitella*) attacking almonds, pistachios, and walnuts in California (2008-2012); and
- Honey bee health, survival, and pollination availability across the United States by controlling bacterial, protozoan, fungal, and viral pathogens of honey bees, as well as *Varroa* and *Acarapis* bee mites (2008-2012).

Other projects that contribute to the ARS IPM program include:

- Community based areawide pest management of silverleaf whitefly across the southern tier of the United States; and an IPM program that has significantly lowered glassy-winged sharpshooter/Pierce's disease in California vineyards.
- ARS scientists in Kearneysville lead a NIFA Specialty Crop Research Initiative project (\$5.7 million) designed to develop monitoring and management tools for BMSB in specialty crops. Fourteen cooperating institutions from 10 states include ARS locations in Beltsville, MD, and Corvallis, OR; Rutgers University; Pennsylvania State University; University of Delaware; Cornell University; University of Maryland; Virginia Tech University; North Carolina State University; Oregon State

University; Washington State University; and the Northeastern IPM Center.

NRCS is an advocate for the use of integrated pest management, and encourages the use of methods that will successfully address the pest problem with the least negative impact upon the natural resources and the environment. Discussions by members of the State Technical Committee in each state set priorities and methods of addressing natural resource issues, including invasive species. NRCS offices across the nation are also active members of a number of Cooperative Weed Management Areas that address invasive species from a regional perspective.

APHIS develops and applies biological control agents as part of an overall pest management program. There are areas infested with invasive plant pests that may not be treated with conventional pesticides or other cultural practices due to environmental sensitivity or public concern. Biological control may offer the only sustainable solution in these areas. For example, APHIS is partnering with ARS to evaluate natural enemies of the brown marmorated stink bug. Because of the broad host range of this pest, it is not possible to develop an integrated area-wide management program without incorporating biological control with other control methods. The natural enemies may become established in residential and natural areas while agricultural production areas may require the use of other control tactics to maintain the pest below economically damaging levels.

APHIS IS and PPQ have worked together to set up biological control programs and to supply biocontrol organisms to countries starting their own colonies (for example, using biocontrol organisms against Pink Hibiscus Mealy Bug in Haiti, Dominican Republic (DR), Jamaica, and Sri Lanka; against *Anastrepha* species in Barbados and DR; and against Papaya Mealy Bug in DR.) The results have been very successful, lowering the impact of the pest to negligible levels.

15. ISAC Recommendation: To further enhance the potential effectiveness of biological control programs, **ISAC recommends federal land management agencies that**

oversee and conduct control operations utilizing biological control agents become more fully engaged in adaptive management by collecting and sharing post-release monitoring data. This Integrated Pest Management (IPM) approach should **emphasize partnerships** with local controlling authorities, post-release monitoring and collaborative programs with land managers and other federal, state and university scientists in other pest management disciplines to develop principles and technical guidance and recommendations for invasive species management. As examples, such efforts have already been established by Team Leafy Spurge and the areawide melaleuca project.

This recommendation addresses the National Invasive Species Management Plan, Implementation Task CM.4.1:

Enhance ecosystem recovery decision tools and conduct ecosystem assessments.

NRCS includes, as a requirement in conservation plans developed with private land-owners, **monitoring the results of integrated pest management efforts in order to determine the performance of various IPM methods.** Lessons learned from this monitoring assists NRCS in **improving the technical assistance** it provides to private landowners in addressing their specific invasive species issues.

USFS-National Forest System is developing new policy (Forest Service Manual and Forest Service Handbook) to provide standards, criteria, requirements and other guidance related to the management of invasive species using an integrated pest management approach. Proper record keeping on treatments and treatment efficacy will be part of the new Handbook, and will include guidance on using an adaptive resource management approach and promoting the sharing of treatment information with partners when applicable.

16. ISAC Recommendation: In accordance with the National Environmental Policy Act (NEPA), ISAC recommends that NISC Departments, Agencies and their contractors assess the risk of invasiveness whenever their activities lead to the introduction of [non-native] species or their subsets (i.e. moving

organisms from where they occur to where they have never occurred historically).

ARS research projects follow the procedures described in the Code of Federal Regulations Title 7, Subtitle B, Chapter V, Part 520 for implementing the National Environmental Policy Act. These procedures assure that research and other activities of the Agricultural Research Service (ARS) comply with the intent of the National Environmental Policy Act of 1969 (NEPA) and appropriate regulations implementing this Act. These procedures incorporate and supplement, and are not a substitute for, CEQ regulations under 40 CFR parts 1500-1508, and Department of Agriculture NEPA Policies and Procedures under 7 CFR part 1b. ARS conducts and supports research as authorized by legislation to support one of the USDA goals of assuring adequate supplies of high quality food and fiber. Information generated through such research often forms the basic data needed to assess the impact of a new technology upon the environment. Large scale projects simulating commercial practices are normally implemented in cooperation with other agencies of the Federal or State Governments.

Climate change is requiring NRCS to re-think our definition of, and preference for “native species.” Some plants considered to be “native” to specific locations may, due to climate changes, no longer be able to survive, or may become invasive. NRCS always assesses the risk of invasiveness when restoring areas, but, due to climate changes, we, and our partners in restoration, must now consider the viability and impacts of plants whether they are historically considered to be “native” or “invasive” to the specific location and climate.

USFS-National Forest System is developing new policy (Forest Service Manual and Forest Service Handbook) which will include requirements, standards, criteria, and other guidance on the use of standardized contract language and restrictions to prevent and control invasive species on National Forests and Grasslands, including during activities conducted by permittees, contractors, and other cooperators.

I. **USDA Progress on ISAC recommendations from the December 2011 meeting**

17. ISAC Recommendation: Expanding trade across the Pacific poses a dual challenge to the control of invasive species. First, there is a high potential for introductions of new species in both directions. Second, there is a high potential that some introduced species will become invasive because of similarities between the climates and ecology of central and eastern Asia and North America. In light of these challenges and the potential negative impacts of the introduction of invasive species in either direction across the Pacific on the economies and environment of the U.S. and its trading partners in eastern Asia, **ISAC recommends that the Department of State seek the cooperation of appropriate agencies in convening a multilateral meeting of scientists and governmental representatives from APEC countries to develop measures to prevent the introduction of invasive species in the course of transpacific commerce.**

APHIS, USFS and ARS would participate in such a meeting when invited by the US Department of State and China.

US Forest Service is cosponsoring a meeting of the International Union of Forest Research Organizations Work Unit on Invasive Species in International Trade in China October 23-November 1, 2013. The group will meet jointly with the International Congress on Invasion Biology and the International Forestry Quarantine Research Group.

18. ISAC Recommendation: Please prepare a **special report on the budget impacts to invasive species programs** for the ISAC Spring 2012 meeting.

Budget table for USDA programs on invasive species:

Funding Available for Invasive Species General Categories

Departmental Template – USDA

Dollars in Thousands

USDA	Agency	FY 2010 Actual	FY 2011 Actual	FY 2012 Enacted	FY 2013 Pres.Budget
Prevention	APHIS b/	\$ 113,552	\$ 102,562	\$ 106,223	\$ 101,056
Prevention	ARS	\$ 5,691	\$ 5,440	\$ 5,518	\$ 5,518
Prevention	NIFA	\$ 3,123	\$ 2,241	\$ 2,242	\$ 2,164
Prevention	ERS	\$ -	\$ -	\$ -	\$ -
Prevention	USFS	\$ 38,218	\$ 37,103	\$ 26,103	\$ 26,273
Prevention	NRCS	\$ 8,655	\$ 8,448	\$ 9,437	\$ 9,637
Prevention Total		\$ 169,239	\$ 155,794	\$ 149,523	\$ 144,648
Early Detection & Rapid Response	APHIS	\$ 255,646	\$ 221,419	\$ 224,154	\$ 210,607
Early Detection & Rapid Response	ARS	\$ 8,087	\$ 7,838	\$ 5,933	\$ 5,905
Early Detection & Rapid Response	NIFA	\$ 5,860	\$ 4,278	\$ 4,278	\$ 4,146
Early Detection & Rapid Response	ERS	\$ -	\$ -	\$ -	\$ -
Early Detection & Rapid Response	USFS c/	\$ 700	\$ 590	\$ 9,500	\$ 9,320
Early Detection & Rapid Response	NRCS	\$ 8,655	\$ 8,448	\$ 9,437	\$ 9,637
Early Detection & Rapid Response Total		\$ 278,948	\$ 242,573	\$ 253,302	\$ 239,615
Control	APHIS	\$ 288,579	\$ 280,143	\$ 248,356	\$ 238,368
Control	ARS	\$ 100,264	\$ 94,752	\$ 81,895	\$ 78,179
Control	NIFA d/	\$ 13,997	\$ 10,536	\$ 10,551	\$ 10,328
Control	ERS	\$ -	\$ -	\$ -	\$ -
Control	USFS	\$ 42,664	\$ 49,902	\$ 44,257	\$ 44,174
Control	NRCS	\$ 86,549	\$ 84,484	\$ 94,367	\$ 96,371
Control Total		\$ 532,053	\$ 519,817	\$ 479,426	\$ 467,420
		FY 2010 Actual	FY 2011 Actual	FY 2012 Enacted	FY 2013 Budget
Research	APHIS	\$ 54,546	\$ 56,481	\$ 60,738	\$ 58,368
Research	ARS	\$ 124,888	\$ 122,166	\$ 117,153	\$ 116,532
Research	NIFA	\$ 18,370	\$ 13,832	\$ 13,857	\$ 13,570
Research	ERS a/	\$ 1,000	\$ 1,000	\$ 835	\$ 835
Research	USFS	\$ 37,463	\$ 36,004	\$ 35,800	\$ 33,346
Research	NRCS	\$ -	\$ -	\$ -	\$ -
Research Total		\$ 236,267	\$ 229,483	\$ 228,383	\$ 222,651
Restoration	APHIS	\$ -	\$ -	\$ -	\$ -
Restoration	ARS	\$ 296	\$ 353	\$ 442	\$ 442

Restoration	NIFA	\$ 2,416	\$ 1,808	\$ 1,810	\$ 1,769
Restoration	ERS	\$ -	\$ -	\$ -	\$ -
Restoration	USFS	\$ 7,222	\$ 7,580	\$ 7,338	\$ 6,244
Restoration	NRCS	\$ 25,964	\$ 25,345	\$ 28,310	\$ 28,911
Restoration Total		\$ 35,898	\$ 35,086	\$ 37,900	\$ 37,366
Ed & Public Awareness	APHIS	\$ -	\$ -	\$ -	\$ -
Ed & Public Awareness	ARS	\$ 46,356	\$ 44,342	\$ 39,058	\$ 37,727
Ed & Public Awareness	NIFA	\$ 4,111	\$ 2,996	\$ 2,982	\$ 2,873
Ed & Public Awareness	ERS	\$ -	\$ -	\$ -	\$ -
Ed & Public Awareness	USFS	\$ -			
Ed & Public Awareness	NRCS	\$ 43,275	\$ 42,242	\$ 47,183	\$ 48,186
Ed & Public Awareness Total		\$ 93,742	\$ 89,580	\$ 89,223	\$ 88,786
Leadership/Intl. Cooperation	APHIS	\$ 56,979	\$ 56,194	\$ 47,313	\$ 46,910
Leadership/Intl. Cooperation	ARS	\$ -	\$ -	\$ -	\$ -
Leadership/Intl. Cooperation	NIFA	\$ 3,405	\$ 2,520	\$ 2,511	\$ 2,433
Leadership/Intl. Cooperation	ERS	\$ -	\$ -	\$ -	\$ -
Leadership/Intl. Cooperation	FS	\$ 180	\$ 315	\$ 242	\$ 242
Leadership/Intl. Cooperation	NRCS	\$ -	\$ -	\$ -	\$ -
Leadership/Intl. Cooperation Total		\$ 60,564	\$ 59,029	\$ 50,066	\$ 49,585
		FY 2010 Actual	FY 2011 Actual	FY 2012 Enacted	FY 2013 Budget
Agriculture Department Total		\$1,406,711	\$ 1,331,362	\$ 1,287,823	\$ 1,250,071

- a/ ERS contributes to the USDA's invasive species efforts through the pesticide use and pesticide management systems economic research and analysis program, which contributes to Integrated Pest Management (IPM), Food Quality Protection Act implementation, invasive species and the areawide IPM programs.
- b/ APHIS figures for 2012 Enacted and 2013 Budget are estimated obligations, including prior year funding. FY10 actuals have been restated due to implementation of new budget structure, reporting and data analysis capacities.
- c/ Forest Service data now captures Eradication and Rapid Response expenditures, based on refinement of the workplace database tracking systems for invasives species work
- d/ NIFA expenditures are impacted and vary from year to year due to the availability of grant funding.

AGENCY TOTAL BUDGETS	AGENCY	FY 2010 Actual	FY 2011 Actual	FY 2012 Enacted	FY 2013 Pres.Budget
	APHIS	\$ 769,302	\$ 716,799	\$ 686,784	\$ 655,309
	ARS	\$ 285,582	\$ 274,891	\$ 249,999	\$ 244,303
	NIFA	\$ 51,282	\$ 38,211	\$ 38,231	\$ 37,283
	ERS	\$ 1,000	\$ 1,000	\$ 835	\$ 835
	USFS	\$ 126,447	\$ 131,494	\$ 123,240	\$ 119,599
	NRCS	\$ 173,098	\$ 168,967	\$ 188,734	\$ 192,742

APHIS Examples of Budget Impacts on Invasive Species Activities

APHIS in FY 2010

- In FY10, APHIS' total appropriation was approximately \$909 million, an increase of nearly \$28 million over the FY09 level.
- In FY10, APHIS received funding increases for programs that target invasive species, such as the Asian long-horned beetle (+ \$13 million for a total of \$33 million), emerald ash borer (+ \$2.5 million for a total of \$37.2 million), a variety of citrus pests and diseases (+ \$8.9 million for a total of \$44.6 million), and cattle fever ticks (+ \$3 million for a total of \$13.2 million).

APHIS in FY 2011

- In FY11, APHIS' total appropriation was nearly \$867 million.
- Congress removed all earmarked funding (a total of about \$27 million) from APHIS' budget in FY11.
- Some of the earmarks supported invasive species programs, such as efforts to prevent the introduction of the brown tree snake into Hawaii and to control it on Guam.

APHIS in FY 2012

- APHIS' FY12 appropriation is \$819.7 million, a decrease of more than \$47 million from the FY11 funding level.
- Even with the overall decrease in funding, APHIS received increases to target several invasive species, including \$7 million for the Asian long-horned beetle (ALB) (for a total of about \$40 million), \$9 million for the light brown apple moth (for a total of about \$10 million) and \$2.5 million (in total) for the European grapevine moth, both pests that damage fruit production in California.
- APHIS moved to a new budget structure that aligns funding with the commodity or resource group it protects, rather than specific pests or diseases. Examples of the new line items include Tree and Wood Pests and Cattle Health. This new structure will give APHIS flexibility to address new threats as they emerge. APHIS is using this new flexibility to devote additional funding (beyond the increase mentioned above) to ALB eradication in FY12.

- In the FY12 budget, APHIS proposed a change in its strategy and funding level for the emerald ash borer because of lack of practical control tools for the pest and received a corresponding decrease in funding of approximately \$24 million (from \$37 million to \$13 million).

APHIS in FY 2013 President's Proposed Budget

- The President's Budget proposes \$765 million in FY13, a decrease of \$54 million from the FY12 funding level.
- The budget request includes a variety of decreases, some related to efficiencies and process improvements that will allow APHIS to continue providing the same level of services but at a lower cost. In other cases, APHIS proposes to eliminate or scale back the Federal role in pest or disease programs because the particular pest or disease has become too widespread. Two invasive species programs fall into this category, including Tree and Wood Pests (where APHIS is proposing to further scale back its emerald ash borer (EAB) effort to focus on outreach and biological control initiatives) and Equine and Cervid Health (where APHIS is proposing to eliminate federal funding for chronic wasting disease).

Economic Research Service Invasive Species Activities

Program of Research on the Economics of Invasive Species Management (PREISM): Extramural and Intramural Research

- Since FY03, \$7.5 million funded 53 extramural research projects.
- PREISM resulted in over 100 journal articles and book chapters, numerous conference papers, and close to 20 doctoral dissertations and Master's theses.
- Recipients presented results to APHIS and other Federal and State agencies; several participated in the National Academy review of the light brown apple moth program.
- ERS intramural research addressed soybean rust, integration of prevention and control strategies, and approaches to pest exclusion.
- Eight PREISM Workshops (FY03 to FY11) discussed economics of invasive species and presented results.

ERS Program Impacts Based on Reduced Funding

- ERS reduced funding to new extramural projects on the economics of invasive species management through PREISM, but continues to emphasize intramural research and the annual PREISM workshops.
- In FY12 and FY13, ERS' research supports intramural economic analysis of invasive species management, which addresses USDA program and policy issues, especially with respect to climate change.

ARS Examples of Budget Impacts on Invasive Species Activities

ARS Invasive Species Research FY10-13

Please see budget table above.

ARS Systematics Funding:

FY10 \$21,982 K
 FY11 \$20,36 K
 FY12 \$19,956 K
 Proposed FY13 \$19,937 K

ARS Scientist Years (as a Percentage of FY 2009)

<u>Fiscal Year</u>	<u>All projects</u>	<u>Invasive Species projects</u>
FY09 (actual)	2,152 scientist yrs	349 scientist yrs
FY10	2,130 scientist yrs	341 scientist yrs
FY11	2,113 scientist yrs	340 scientist yrs
FY12	1,990 scientist yrs	292 scientist yrs (of these, lost 20 classic entomologist scientist positions)
FY13		Lose 4 classical entomologist scientist positions

CORRECTION as of July 2, 2012:

Dr. Tony Betschart (ISAC) requested ARS the number of FTEs lost in Systematics as a result of budget loss. In that exercise, ARS found a mistake in their previous budget calculations for Systematics. The new and correct numbers are below:

ARS Systematics Funding:

**FY10 \$20,455 K
 FY11 \$20,578 K
 FY12 \$20,398 K**

Proposed FY13 \$20,379 K

Explanation: because of fund transfers between projects, there was a small (~\$123K) increase in systematics funding in FY11. This increase reflects some incremental funding adjustments to a few projects which occurred without a change in systematist FTEs. However, those gains were erased in 2012 with a loss of ~\$180K which included the impact of lab closures and the loss of 0.6 systematist FTE. The small decrease from FY12 to FY13 reflects a proposed termination. The latter, of course, is likely to change when the final FY13 budget is approved. **In summary, the actual number of ARS systematists Scientist Years (Sys) have changed little over the past few years.**

Update 7 Feb 2013:

Further analysis by ARS has this updated report on spending in Systematics:

FY 2008 - \$20,936,000

FY 2009 - \$21,189,000

FY 2010 - \$21,982,000

FY 2011 - \$20,136,000

FY 2012 - \$19,956,000

FY 2013 President's Budget - \$19,937,000

NIFA Examples of Budget Impacts on Invasive Species Activities

NIFA in FY 2010

- NIFA's Biology of Weedy and Invasive Species in Agroecosystems Program was discontinued in AFRI in FY10, which eliminated approximately \$4 million in invasive species funding and work.

NIFA in FY 2011

- NIFA's Crops at Risk (CAR), Risk Avoidance and Mitigation Program (RAMP), and Critical Issues Programs were eliminated in FY11. These programs funded approximately \$6 million worth of projects on invasive arthropods, weeds and plant diseases, often on a landscape or area-wide scale.
- From FY00 to FY11, IPM funding from NIFA has been cut by 36% (source: IPM Voice).

NIFA in FY 2012

- NIFA's Crops at Risk (CAR), Risk Avoidance and Mitigation Program (RAMP), and Critical Issues Programs were again eliminated in FY12.

NIFA in FY 2013

- The failure of Congress to pass the 2012 Farm Bill resulted in major cuts in mandatory program funding for NIFA in FY13, including the loss of the Specialty Crop Research Initiative (\$47.3 million (M)), the Organic Agricultural Research and Extension Initiative (\$19 M), and the Beginning Farmers and Ranchers Program (\$19 M).

NRCS Examples of Budget Impacts on Invasive Species Activities

NRCS in FY 2010

- Use of FY10 funds by NRCS State offices to address invasive species indicate a slight increase over funds used in FY09.
- There were no Conservation Innovation Grant funds awarded to proposals addressing invasive species issues.

NRCS in FY 2011

- Use of FY11 funds by NRCS State offices to address invasive species indicate some increase over funds used in FY10.
- There were no Conservation Innovation Grant funds awarded to proposals addressing invasive species issues.

NRCS in FY 2012

- Use of FY12 funds by NRCS State offices to address invasive species in FY12 were about 3% less than funds used in FY 11.

- Invasive species was not a focus area for the FY12 Conservation Innovation Grants.

NRCS in FY 2013 President's Proposed Budget

- Funds used by the NRCS State offices to address invasive species in FY13 are anticipated to be a slight increase over the funds that were used in FY12.
- The focus areas for the FY13 Conservation Innovative Grants have not been finalized.

USFS Examples of Budget Impacts on Invasive Species Activities

USFS in FY 2010

- 13% reduction in Sudden Oak Death research (\$2.4M).
- Funding integration and growth resulted in USFS National Forest System invasive species management activities advancing in FY10, resulting in 419,598 acres of priority infestations treated spanning multiple taxa of aquatic and terrestrial, invasive species.
- In FY10, National Forests and Grasslands restored 318,591 acres against invasive species through a national average restoration outcome of 78.6%.

USFS in FY 2011

- 5% decrease in Forest Service research budget and loss of 4% research capability on invasive species (Gypsy Moth, Emerald Ash Borer, Hemlock Woolly Adelgid, Gold Spotted Oak Borer, Laurel Wilt, Beech Bark Disease, Butternut Canker, Invasive Plants).
- 67% reduction in Sudden Oak Death research (\$2.1M).
- Agency-wide Travel Constraint: Travel to professional meetings and funding to partners reduced.
- Funding integration and growth in FY11 resulted in National Forest System invasive species management activities achieving 352,091 acres of priority infestations treated on multiple taxa of aquatic and terrestrial invasive species.
- The focus on high priority infestations resulted in a higher average unit cost per acre for many treatments against high risk species.

- In FY11, National Forests and Grasslands restored 265,751 acres against invasive species through a national average restoration outcome of 75.2%.

USFS in FY 2012

- 5% decrease in Forest Service research budget and loss of 0.5% research capability on invasive species (Emerald Ash Borer, Asian Longhorned Beetle, Hemlock Woolly Adelgid, Gypsy Moth, Gold Spotted Oak Borer, Thousand Canker Disease, Laurel Wilt, Beech Bark Disease, Oak Wilt, Butternut Canker, Invasive Plants, Terrestrial and Aquatic Invasives).
- 95% reduction in Sudden Oak Death research (\$100K).
- Elimination of lower priority lines of invasive research and funding to partners.
- Agency-wide Travel Constraint: Limited travel to professional meetings and for field work.
- In FY12, National Forest System restructured its budget around Integrated Resource Restoration, targeting restoring and improving watershed condition through a variety of integrated activities, including management of aquatic and terrestrial invasive species on national forests and grasslands.
- FY12 expenditures for integrated invasive species management activities (including prevention, early detection and rapid response, control) were estimated at \$55 million for the National Forest System.
- As per new policy (FSM 2900), the focus on high priority infestations will likely result in a higher average unit cost per acre for many treatments against high risk species.

USFS in FY 2013 President's Proposed Budget

- 5% decrease in Forest Service research budget and loss of 7% research capability on invasive species (Emerald Ash Borer, Asian Longhorned Beetle, Hemlock Woolly Adelgid, Gypsy Moth, Gold Spotted Oak Borer, Thousand Canker Disease, Laurel Wilt, Beech Bark Disease, Oak Wilt, Butternut Canker, Invasive Plants, Terrestrial and Aquatic Invasives).
- 98% reduction in Sudden Oak Death research (\$75K).
- Loss of insect rearing facility in California.
- Elimination of lower priority lines of invasive research and funding to partners.

- Agency-wide Travel Constraint: Limited travel to professional meetings and for field work.

I. **USDA Progress on ISAC recommendations from the May 2012 meeting**

19. ISAC Recommendation: ISAC recommends that NISC adopt the Invasive Species and E-Commerce White Paper.

Invasive Species and E-commerce Paper Recommendations:

ISAC concludes that relevant federal agencies need to adjust existing regulations and enforcement practices to better mitigate the risks of trade and transport of invasive species through e-commerce. ISAC offers the following recommendations to enhance our collective ability to engage in e-commerce without promoting the introduction or spread of invasive and potentially invasive species. (Only the recommendations applicable to USDA agencies are included in this Report to ISAC)

ISAC Recommendation 19-1: Department of Interior, U.S. Fish and Wildlife Service (DOI/FWS) and U.S. Department of Agriculture, Animal and Plant Health Inspection Service (USDA/APHIS): **Expedite listing process for the national importation of injurious wildlife and other animals and noxious plants under the Lacey Act, the Plant Protection Act and the Animal Health Protection Act to better assess and address emerging invasive species threats, including those associated with e-commerce.**

Please see the description of APHIS' new NAPPRA category (not authorized pending pest risk analysis) for regulating the importation of plants for planting, as described above in response to the recommendation regarding imports and border protection.

ISAC Recommendation 19-4: USDA/APHIS: Expand the scope of webcrawlers and related enforcement and monitoring activities used by the Smuggling Interdiction and Trade Compliance unit to include a broader array of invasive plants and plant pests, and enhance cooperation with U.S. Fish and Wildlife Service (DOI) to address injurious wildlife.

APHIS is currently performing webcrawler analysis in the SITC unit. The approach needs further refinement to find the products with the highest risk. APHIS has formed a technical working group to assist SITC in prioritizing the highest risk items they are finding. APHIS is committed at the highest levels to continue to develop our capacity in this area and work collaboratively with other agencies, including the FWS, to address risks associated with e-commerce. **APHIS SITC collaboration with FWS was initiated in FY12 to address injurious wildlife issues in e commerce.**

ISAC Recommendation 19-5: USDA Agricultural Research Service: Support development of and capacity for an Internet clearinghouse of federal and state-listed invasive species such as injurious wildlife, other animals and noxious weeds and of relevant regulations. Such a resource could be located at the **National Agricultural Library's** Invasive Species Information Center or another appropriate website and should include relevant agency contact information and a general reporting form that allows the public to report suspected violations.

The National Agricultural Library's (NAL) National Invasive Species Information Center (NISIC) will be unable to develop, maintain and host the proposed Internet clearinghouse, agency directory and reporting form without a significant increase in funds and staffing. The NISIC's annual budget has been reduced, and the Center is currently staffed by only 1 FTE. Under such severe limitations, the Center cannot be expected to grow its Web content or enhance the site's functionality in the way broadly envisioned in this recommendation.

Should sufficient new funds be made available, NAL will be willing to consider taking on the responsibility of the clearinghouse. First, however, NAL will need to work in concert with NISC and ISAC to better understand what content and functionality is needed to bring this recommendation to fruition. NAL will then use that information to decide how it can best be involved and whether it can reasonably expand the NISIC Web site into the proposed clearinghouse and reporting site for suspected violations.

Currently, NISIC (www.invasivespeciesinfo.gov) provides information for many Federal and State-listed invasive species, including injurious wildlife, other animals and noxious weeds, and lists relevant regulations. NISIC also answers reference questions and refers patrons looking to report suspected violations to appropriate agency personnel.

ISAC Recommendation 19-6: DOI/FWS, USDA/APHIS, Department of Commerce, National Oceanic and Atmospheric Administration (DOC/NOAA) and other relevant agencies: **Provide a reference catalog or database of taxonomic resources that commercial interests can use to verify the taxonomic identity of organisms in trade.**

ISAC Recommendation 19-8: DOI/FWS, USDA/APHIS and DOC/NOAA: **Promote outreach to individuals and businesses involved in the sale and exchange of species over the Internet to reduce intentional and unintentional sales or purchases of species listed as invasive in the U.S. or particular states.**

APHIS IS discusses invasive species with counterparts overseas. [APHIS PPQ SITC \(law enforcement\) continues to monitor the sale and exchange of species over the Internet and provides outreach to companies like eBay.](#)

20. ISAC Recommendation: ISAC recommends that **NISC adopt the Validation of PCR-Based Assays and Laboratory Accreditation for Environmental Detection of Aquatic Invasive Species (AIS) White Paper.**

To encourage the development of a validation/accreditation system for AIS environmental DNA (eDNA) detection methodologies and laboratories ISAC recommends the following:

ISAC Recommendation 20-11: Utilize lessons learned in establishing a laboratory performance testing system to fully develop a validation/accreditation program(s) for other invasive species eDNA methodologies and laboratories.

ARS supports several projects on the development of DNA-based technologies for the detection of invasive species.

The National Plant Diagnostic Network system (NPDN), with support from the USDA-NIFA and through the collective efforts of many individuals representing Land Grant Universities, federal agencies, state departments of agriculture, and other stakeholders, has grown into an internationally respected consortium of plant diagnostic laboratories. These diagnostic laboratories use conventional and/or molecular genetic taxonomic approaches to quickly detect high consequence pests and pathogens that have been introduced into agricultural and natural ecosystems, identify them, and immediately report them to appropriate responders and decision makers. The NPDN, with support from NIFA, is in the process of establishing an accreditation and standards system so that NPDN laboratories may reliably perform sensitive diagnostic tests with the oversight and recognition required by the regulatory authorities in the APHIS.

I respectfully submit this report to ISAC. If you have any questions, please do not hesitate to contact me. Thank you.

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